

REDUCING POVERTY THROUGH SUBSIDIES: SIMULATION OF FUEL SUBSIDY DIVERSION TO NON-FOOD CROPS

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Abstract

This paper analyzes the impact of fuel subsidy diversion to Non-Food Crops sector on income levels, using AGEFIS; a Computable General Equilibrium model. Then we proceed to apply the Foster-Greer-Thorbecke (FGT) index to measure the indicators of poverty (head count index, poverty gap index and poverty severity index). The simulation result shows the fuel subsidy diversion to Non-Food Crops sector provides a positive impact on increasing household incomes and poverty reduction. Furthermore, the fuel subsidy diversion to Non-Food Crops sector reduces the poverty of rural household, larger than the urban households.

Keywords: Subsidy, poverty, computable general equilibrium, AGEFIS.

JEL Classification: C68, E62, I32

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I. INTRODUCTION

Fuel is one of the several commodities with larger influence on other commodities. Changes in fuel prices will directly or indirectly affect the price of other commodities including essential commodities like food, clothing and shelter. This price change will in turn affect the income levels and poverty. Therefore, to protect the poor and the near poor household, the government can intervene against the fuel prices increase by providing subsidies.

However, the drastic increase of the world oil prices since 2008 (Reyes, *at.al*, 2009; FAO, 2008), the shifting position of Indonesia from net oil exporter to net importer, and the growing needs on the fuel make the subsidy burden increasingly bloated and continuously drive the national budget into deficit. On the other hand, various studies argued that the fuel subsidies were not efficient since most of the subsidies were miss target and received by the non-poor. Issue of fuel subsidies has been a lively discussion, with various topics, such as how large the fuel subsidy will put burdens on the state budget? Is it well targeted? Should the fuel subsidy need to be continued? How to exit from the fuel subsidies trap?

In relieving the budget burden in Indonesia, the government has taken various fiscal policies such as the gradual elimination of fuel subsidies by Presidential Decree No. 55/2005; the remaining fuel subsidies would be abolished though the time of implementation has not been determined yet (World Bank, 2005). The elimination of fuel subsidy would trigger the rise of other commodity prices, raises inflation, lowering purchasing power (real income) and could lead the increase of poverty rate.

Poverty remains a crucial problem and being regarded as a very complex phenomenon for each country (Hung and Makdissi, 2004; Marianti and Munawar, 2006, Maipita *et al*, 2010). Even the poverty alleviation has been the main objective of public policy in almost all of industrial society (Moller, *at.al*, 2003). The government within the country makes a great effort to relieve the problems through their fiscal instruments.

There are several facts related to the poverty and agriculture sector; (1) most of poor population in rural livelihood is dominated by agriculture sector, (2) experience during the monetary crisis in 1998 showed that the Agricultural sector is one of the few sectors that remained survive to the crisis, (3) agriculture produces food and raw materials for industrial and service sectors, (4) employment in the agricultural sector is very flexible, so that agriculture can serve as a safety net (survival sector) in an emergency (Stringer, 2001; Hafizrianda, 2007; Bautista, 2000; Maipita *et al*, 2010; Maipita, 2011). The study conducted by Suselo and Tarsidin (2008) state that agriculture, plantations, and fisheries are sectors which possess the highest poverty rates and poverty elasticity to the highest economic growth. Besides, the new paradigm of developing agriculture puts the *agriculture led industrialization* as an industrialization strategy that focused on the development programs in the agricultural sector because it was considered appropriate to be conducted in developing countries (Susilowati, 2008).

Starting from the above description, we raise the question of what if the subsidy is transferred to Non-Food Crops sector. The goal of this research is to determine the impact of the fuel subsidy diversion (from Food Crops to Non-Food Crops) on the level of income and poverty in Indonesia.

The next session of this paper discusses the theory and the microeconomic underpinning of the model. Session three discusses the methodology and data we use. Session four provides the result and analysis of the simulation. Conclusion will be presented on session five and closes the presentation.

II. THEORY

In general, subsidies are intended to increase the output, demand and productivity, and to maintain the economic stability, especially the price stability. Through the subsidies, basic commodities of the society are available in sufficient quantity, stable and affordable prices (Financial Note and State Budget, 2010; Handoko and Patriadi, 2005; Norton, 2004; Kasiyati, 2010).

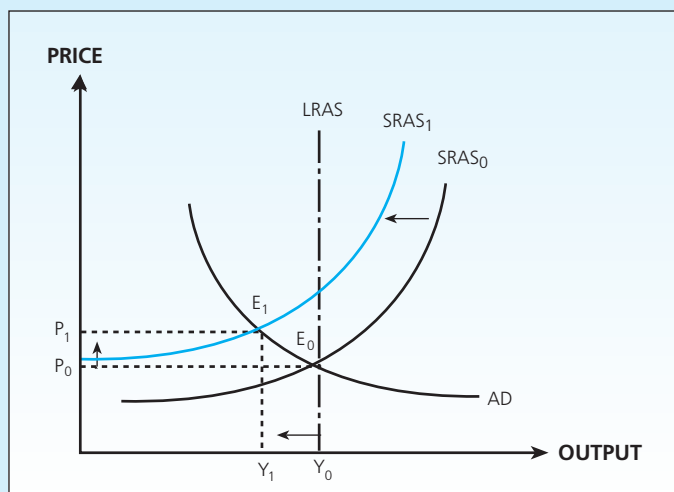
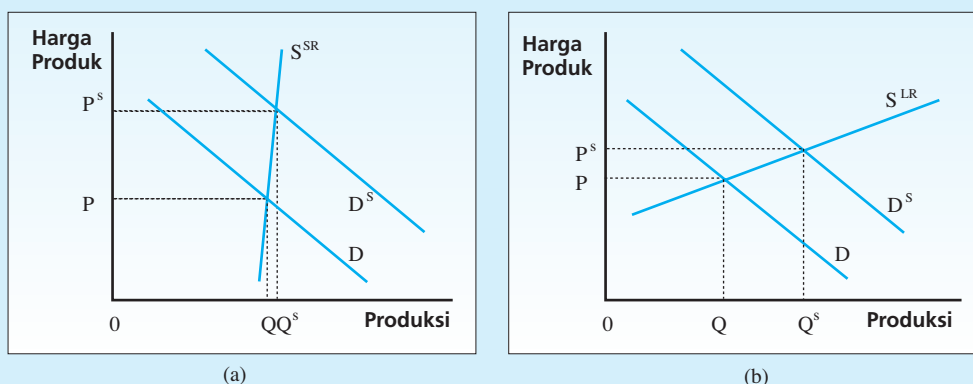


Figure 1. The impact of Reduction of Fuel Subsidy on Economic Equilibrium

Theoretically, the reduction in fuel subsidies will increase the fuel prices and the price of other goods. These price increases can lower the output. As shown in Figure 2, in the short term, reduction in subsidies followed by the price increase will in turn increase the production costs. This will shift the SRAS curve to the left (from $SRAS_0$ to $SRAS_1$). Assuming the AD is fixed

(AD_0), and then equilibrium will move from E_0 to E_1 . The final result is a price increase from P_0 to P_1 (Cost push inflation) and decline in output from Y_0 to Y_1 .

The effect of a government subsidy, especially for agricultural products, is illustrated in Figure 2. We assume the short run supply of agricultural product (SR) is inelastic (see panel a). If the government provide subsidy for agricultural product, then the impact would be an increase in the product demand, i.e. the demand curve shifts to the top right. An increase in demand leads to an increase in price, but in the SR the farmers are unable to increase their production. However, in the long run (LR), subsidy on agricultural production leads to an increase in quantity supplied, since in the LR, the supply curve is more elastic (see panel b).



Source: Stieglitz (2000)

Source: Stieglitz (2000)

Figure 2.
The Effect of Subsidy on Agricultural Output

A subsidy policy is associated with a good or service with positive externality, in order to increase the output. This is the positive impact of subsidy. However, a negative effect of the subsidy is allocative inefficiency, since the consumer pay lower price relative to the market. As such, there is a tendency for the consumer to consume the subsidized good excessively. Since the price is lower than the opportunity cost, then there is a waste of resources to produce a subsidized good (Spencer & Amos, 1993). A subsidy which is not transparent and not well targeted creates price distortion, inefficiency, and failed to reach the intended beneficiary (Basri, 2002).

The above theory is a partial equilibrium framework. In reality, the economy consists of simultaneous interaction of many markets (from input vs. output market, and domestic vs. foreign market). This simultaneous equation also involve all economic agents; from household, firms, government and foreign. The Computable General Equilibrium (CGE) is one model with capability to analyze this simultaneous interaction. We utilize the AGEFIS model, one of CGE type model.

In general, the equations on the model are categorized into six blocks: (1) Domestic-import sourcing; equation relates to demand composition by source of commodities (domestic and import), presented in Armington specification, (2) Purchase's price equation that link the producer's price or international price to the consumer's price, (3) Demand for commodity; equation related to the demand of all users, (4) Production sector; (5) Market clearing; and (6) Institution; consisting of equation that specify the income and the expenditure of the household, government, firm and foreign. We will explain this block of equation on the next session.

2.1. Domestic – Import Sourcing

An economic agent (users) maximizes the composition of imported and domestically produced goods, by minimizing transaction cost as shown in the CES aggregation function.

$$\begin{aligned} \text{Min. : } & \sum_s PQ(c, s)XD(c, s) \\ \text{S.t. } & XD_S(c) = CES(XD(c, s) \mid \sigma(c)) = (\alpha(c, s) \sum_s \delta(c, s)^{-\rho(c)})^{-\frac{1}{\rho(c)}} \end{aligned} \quad (1)$$

Where $PQ(c, s)$ is consumer price for commodity c by source s , $XD(c, s)$ is demand for commodity c , source s , $XD_S(c)$ is demand for commodity composite, $\alpha(c, s)$ is economic scale, and $\delta(c, s)$ is elasticity of substitution.

The optimization specifies the demand on commodity c by household - $XHOU_S(c)$, firm as intermediate input - $XINT_S(c, i)$, government - $XG_S(c)$ and investment $XINV_S(c)$. We explain each of them on the next session.

2.2. Prices

The price paid by user is the net price after taxes and subsidies. We can specify the price equation for the household as follows:

$$PQ(c, "dom") = (1 + TX(c) - SC(c)).PTOT(c) \quad (2)$$

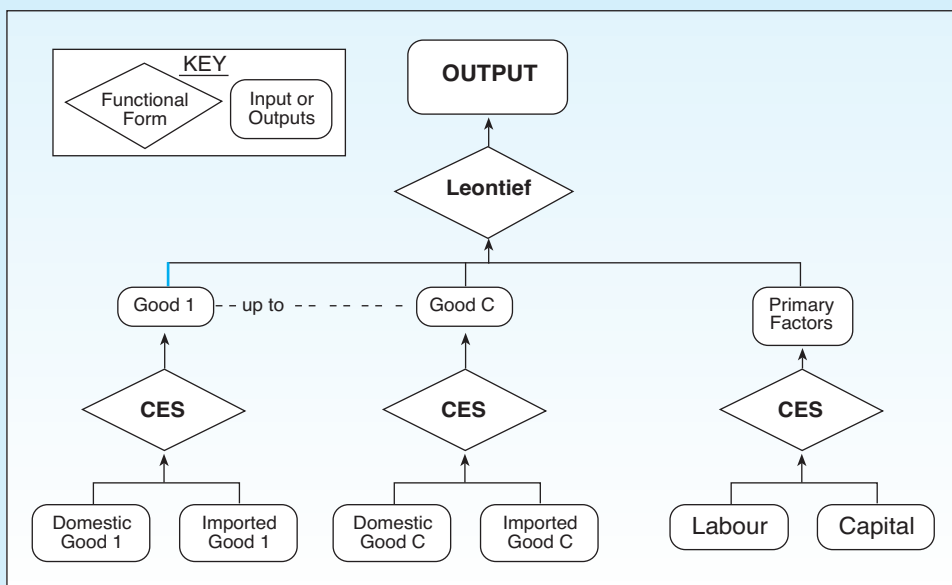
where $PQ(c, "dom")$ is domestic price of each commodity c ; $TX(c)$ is taxes levied on each commodity c ; $SC(c)$ is subsidies imposed on each commodity c ; and $PTOT(c)$ is composite price of commodity c . The imported price is related to international prices, tariffs and the exchange rates, and specified as follows:

$$PQ(c, "imp") = EXR.(1 + tm(c)).PFIMP(c) \quad (3)$$

Where $PQ(c, "imp")$ is imported prices for each commodity c (in domestic currency) after taking account the effect of tariff and exchange rate; EXR is exchanged rate, $tm(c)$ is import tariffs for each commodity c , and $PFIMP(c)$ is the foreign price for each commodity c (in foreign currency).

2.3. Production Sector

Basically, on production process, the firm is assumed to maximize profits. As Diagram 1 depicts, the production input in this model is divided into two namely (1) capital and labor which is primary composite of the production factor, and (2) intermediate inputs which is a composite of domestic and imported inputs. The consequence of using the CES-Leontief function is that all inputs demand has a direct proportion to output.



Source: BKFDK-RI, 2008a; Yusuf et al, 2007

Diagram 1.
Structure of Production

On production process, each industry need primary input, where in AGEFIS model consist of labor and capital. The demand for factor is derived from the cost minimization subject to CES type production function.

$$\begin{aligned}
 \min: & \sum_f WDIST(f,i).PFAC(f).XFAC(f,i) \\
 S.t. & XPRIM(i) = \left[\sum_f \delta_f \left(\frac{XFAC(f,i)}{AFAC(f,i)} \right)^{-\rho} \right]^{-\frac{1}{\rho}}
 \end{aligned} \tag{4}$$

Where $XFAC(f,i)$ is demand for factor f by industry i , $PFAC(f)$ is price of production factors f , $WDIST(f,i)$ is distortion premium for factor f in industry i , and $XPRIM(i)$ is the total value added, which is a composite of labor and capital.

Beside primary input, the production also need intermediate goods $XINT_S(c,i)$, which is a composite from domestic and imported good c . The demand for intermediate goods will be explained on the next session, along with the demand from other users; household, government and investment.

As other CGE model, in AGEFIS, the production of each industry is specified with Leontief function. The reason for using this nesting type is to represent the complementarity relationship between the composite primary input ($XPRIM$) and the composite intermediate goods. The equation is specified as follows:

$$\begin{aligned}
 Min. & PPRIM(i).XPRIM(i) + \sum_c PQ_S(c).XINT_S(c,i) \text{ and so forth} \\
 S.t. & XTOT(i) = \frac{1}{ATOT(i)} \cdot MIN \left[all,c,com : \frac{XINT_S(c,i)}{AINT(c,i)}, \frac{XPRIM(i)}{APRIM(i)} \right]
 \end{aligned} \tag{5}$$

Where $PPRIM(i)$ is price of primary factor composite, $XPRIM(i)$ is primary factor composite, $XINT_S(c,i)$ is intermediate input; $XTOT(i)$ is the total output of industry, $ATOT(i)$ is technical change, and $APRIM(i)$ is Armington Elasticity.

The above minimization cost process will give the total output $XTOT(i)$ of industry i as follows :

$$\frac{XINT_S(c,i)}{ATOT(i)} = XTOT(i) \tag{6}$$

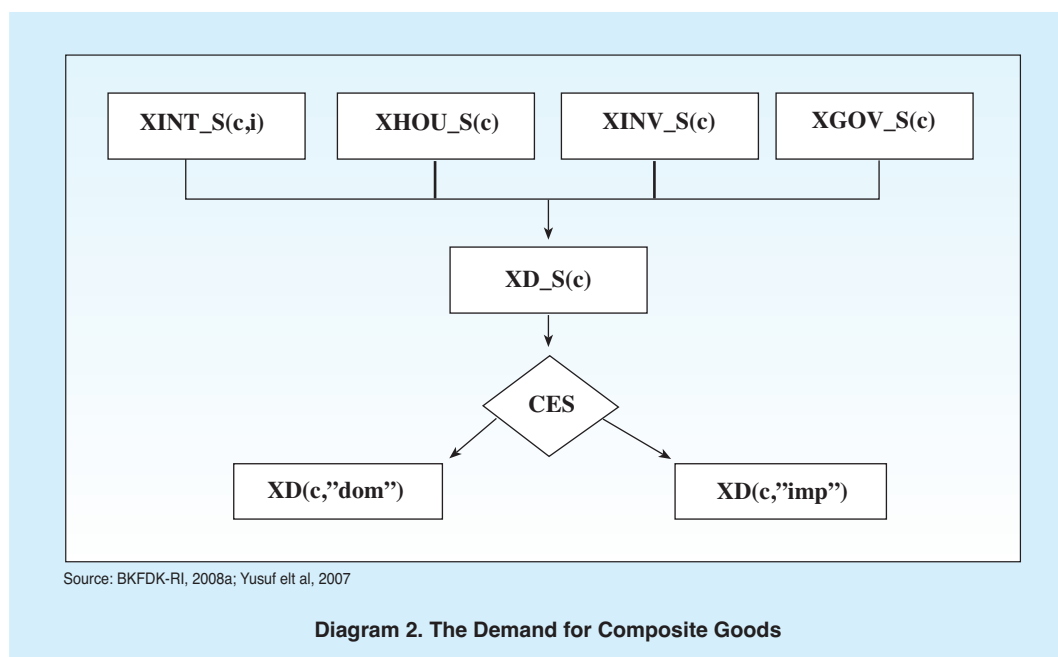
Each industry sales their output both in domestic and foreign market. Depends on the domestic and foreign demand characteristic, the prices, the exchange rate and other determinants, each industry seek the optimal share for the two markets. In level, we specify the equation as follows:

$$XTOT(c) = XD(c, "dom") + XEXP(c) \quad (7)$$

Where $XTOT(c)$ is total demand of commodity c , $XD(c, "dom")$ is total domestic demand for commodity c , and $XEXP(c)$ is export demand for commodity c .

2.4. Institution and Demand for Commodity

The demand for final goods contains of four types; (1) investment demand, (2) industry demand for intermediate input, (3) household demand for consumption, and (4) government demand. The structure of these demands is illustrated on Diagram 2.



The industry demand for intermediate input has been explained on the previous session. The second is household demand for consumption. We assume the household maximize their utility subject to the budget constraint. As other institution, the household can choose and seek the optimal equilibrium among available commodities to consume. The possible substitution underlined the usage of Cobb-Douglass type nesting as depicted on Diagram 3. Of the domestic and import source choices, the household decide his composite of each commodity c based on CES function.

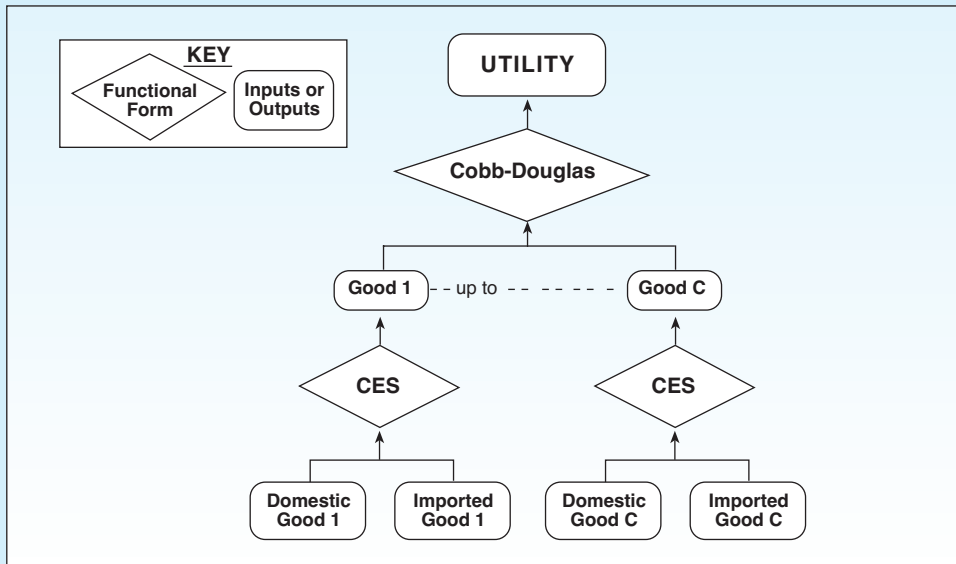


Diagram 3. The Structure of Demand

Households receive income from their ownership on production factors. They also receive other income in the form of transfer payment from various sources, including (1) central government, (2) firms, (3) foreigners, and (4) other households. In the level form, the household's income equation is:

$$YH = \sum_f SFACSH(f)YFAC(f) + TRHOGO + TRHOCO + TRHORO + TRHOHO \quad (8)$$

Where YH is total household's income; $SFACSH$ is the share of households income from factors of production, since the owner of factor production is not only households, but also the government and other firms; $YFAC$ is the factor income; $TRHOGO$ is the transfer from central government to households; $TRHOCO$ is the transfer from firms to households (for examples, scholarship and corporate social responsibility); $TRHORO$ is the transfer from the rest of the world to households (for examples, scholarship and aid); and $TRHOHO$ is inter household transfer.

The third and fourth demand on commodity c is for government expenditure - $XG_S(c)$ and for investment - $XINV_S(c)$. As explained earlier, these demands are also a composite

demand from domestic and imported goods. Further analysis on these two demands is not necessary.

Having examining the four institution demand on each commodity c , we can specify the composite aggregate demand as follows:

$$XD_S(c) = \text{sum}(i, XINT_S(c,i) + XHOU_S(c) + XG_S(c) + XINV_S(c)) \quad (9)$$

where $XD_S(c)$ is the total demand c , $XINT_S(c)$ is total industrial demand for goods c , is total household demand for goods c , is total government demand for goods c , and is total demand of goods c for investment.

III. METHODOLOGY

3.1 Data and Simulation Setting

This study uses a Computable General Equilibrium, adapted from AGEFIS (Applied General Equilibrium for Fiscal Policy) model, which is developed by the Board of Fiscal Policy, Finance Department, Republic of Indonesia (BKFDK-RI) in collaboration with the Center for Economics and Development Studies (CEDs), University of Padjajaran Bandung (BKFDK-RI, 2008;2008a; Yusuf et al, 2007).

The data used in this study is largely a secondary data, a Social Accounting Matrix (SAM) of Indonesia in 2005 and the data of poverty indicators in 2005. Production factors were aggregated into two types, namely labor and capital. The institutions in this study are similar with institutions in Indonesia SAM 2005, which consists of households, firms and governments. For the analysis purposes, the households in SAM table were aggregated into 4 groups, consisting of: (1) HH-1, i.e. the non-poor households in urban area, (2) HH-2, i.e. poor households in urban area, (3) HH-3, i.e. non-poor households in rural area and (4)HH-4, i.e. poor households rural area. Production sector consists of 27 sectors that aggregated from the production sector in Table SAM Indonesia 2005. The sectors that included in the Non-Food Crops sector refers to the Industrial Tax payer Classification (KLU) 2003 (Decision of the Directorate General of Taxation No. KEP-34/PJ/2003, 14 February 2003), which consists of (1) Sugarcane and other Sweeteners, (2) Tobacco, (3) Rubber and other Latex-producing Crops, (4) Fiber Crops for Textileraw materials and the like, (5) Medicinal Plants and Pharmaceutical Crops, (6) Essential Oil Crops,(7) Plantation Crops, which are not classified else where, (8) Horticultural and Vegetables - harvested once, (9) Horticultural and Vegetables- harvested more than once, (10) FlowerCrops, (11) Other Or namental Plants, (12) Horticultural nurseries and seedling Vegetables and Flowers, (13) Seasonal Fruit Crops, (14) Agricultural Fruits throughout the year, (15) Coconut, (16) Palm Oil, (17) Beverage Crops, (18) Cashew nut, (19) Pepper, (20) Clove, and (21) Other spice plantations.

Policy simulations were carried out with three scenarios, which illustrate the magnitude of the transfer in percent subsidy. First simulation (a), the transfer of subsidy by 12.35 percent of total fuel subsidies, the second simulation (b), by 43.2 percent and third simulation (c), by 100 percent.

Related to the structure of the production function, we have to provide the elasticity parameters for each equation for all nesting types; Leontief function, Cobb-Douglas, and CES. These elasticity parameters can be estimated directly or quoted from relevant previous studies. The magnitude impact of the policy simulated on the household income was obtained from the simulation results. Meanwhile, to determine the impact of the policy simulation on poverty, following Son and Kakwani (2004), we use the measurement methods of Foster-Greer-Thorbecke or FGT index.

If the average income increased by ψ , then the income of each household in the group also increased by ψ . Using this rule, the income distribution will shift horizontally and proportionally in revenue. This allows us to compare the poverty rate before and after the simulation. FGT index is specified as follows:

$$P_{\alpha} = \frac{1}{n} \sum_{i=1}^q \left[\frac{g_i}{z} \right]^{\alpha}; \alpha \geq 0; g_i = \frac{Z - y_i}{Z} \quad (10)$$

where y_i is the average income (or expenditure) of the poor, which is restricted by $g_i = 0$ when $y_i > z$, n is the number of population; q is the number of households below the poverty line; g_i is the poverty gap of households i ; z the poverty line; P_{α} is the FGT poverty index; and α is the arbitrary degree of poverty.

When $\alpha = 0$, then P_0 is recognized as the head count index, shows the proportion of population below the poverty line. It is defined as the percentage of poor on total population. When $\alpha = 1$, we obtain index P_1 , measuring the depth of poverty index or the poverty gap index. This index describes the average size of expenditure inequality of the poor against the poverty line, or describes the total gap of all households within the group against the poverty line. When $\alpha = 2$, we obtain P_2 , which represent the poverty severity index.

3.1. Closure

There are two standard closure models used in this study: (1) the short run closure, and (2) the long run closure. The difference between the two is on the factor mobility. In the short run closure, capital is immobile across sectors, hence a fixed input for each industry. We apply this restriction by treat the capital ($xfac$ ("capital", IND)) in all industry as exogenous and eliminate the factor price distortion for capital ($wdist$ ["capital", IND]) from the model ($wdist$ ["labor:

IND] is still used). In addition, we assume the presence of the nominal wage rigidity. To do this, we treat the total labor supply ($xfacsup$ ["labor"]) as endogenous, while the wage rate ($pfac$ ["labor"]) as an exogenous variable.

The long run closure is different from the short run closure. In the long run closure, the total supply of primary factor (capital and labor) are constant (full employment), hence exogenous, but mobile across sectors. This ensures the factor price is the same for all sectors. We translate this setting by making factor price distortion for all factors of production ($wdist[f,i]$) as exogenous, while their price is exogenous. In this closure, variables such as tariff, tax, various types of transfer and technology parameters are also exogenous in nature. The exchange rate variable is numeraire.

IV. RESULT AND ANALYSIS

Subsidy is a government payment to companies and households with specific goal of enabling them to produce or to consume a product in a larger quantity with cheaper price. Subsidies can be in the form of transfer payments (such as food stamps and housing subsidies), and assistance in the agricultural sector (Ericson, et.al, 1998). In the form of goods, subsidy on specific goods is carried out by providing certain amount to the consumer without payment or below the market price (Handoko and Patriadi, 2005).

In developing countries, subsidies are significant as fiscal instruments to boost productivity and improving welfare (Norton, 2004). Subsidies are an efficient form of government transfers as a means of redistribution of wealth across household, or between producers and consumers. With this fundamental importance, the subsidy remains a policy instrument even in the developed country.

From the institutional side, lower taxes and the increase of subsidy can increase the household income, hence their purchasing power. In addition, higher income could support greater households' consumption (Simorangkir and Adamanti, 2010). However, as previously outlined, subsidy has negative impact on allocative inefficiency, excessive input usage, and the possibility of miss target (Basri, 2002).

Overall, the policy scenarios to divert the fuel subsidies to Non-Food Crops Agriculture provide positive impact on increasing income of all household groups (Table 1). This is because most of the households are related to Non-Food Crops sector, either as workers, land owners or as well as businessmen on this sector. The income increase is much larger for the households in villages than the city, since the agriculture is naturally located in the village. From Table 1, the result shows the greater the subsidy diverted, the greater the increase of household income levels.

The subsidy diversion increases the activity of the recipient sector and creates more job opportunities. Many researchers argue that the job is the key to escape from poverty, and the

employment increase is crucial to reduce the inequality (Bluestone and Harrison 2000). Households with working household member possess less possibility of being poor (Hills 2004; Lohmann 2009).

Table 1. Simulation Results of Fuel Subsidy Diversion to Non-Food Crops Agricultural Sector of Household Income Levels (percentage change)

| Household | Changes | | |
|-----------|---------|--------|---------|
| | Sim_a | Sim_b | Sim_c |
| HH-1 | 0.4674 | 1.2544 | 16.7885 |
| HH-2 | 0.3224 | 0.5230 | 11.7780 |
| HH-3 | 0.5709 | 1.8104 | 20.5742 |
| HH-4 | 0.4589 | 1.3746 | 17.4994 |

Source: Research Result

This subsidy diversion policy is not only able to raise the level of household income, but also reduce poverty. The additional income originated from the subsidy, has lifted them from poor or slightly below the poverty line, to above the poverty line.

Table 2 to Table 4 show that the greater the subsidy diversion, the greater its impact on poverty reduction. The diversion subsidy of 12.35 percent can reduce poverty by 1.61 percent of total poor households in the city, and 2.18 percent in rural area. Diversion subsidy of 43.2 percent can reduce poverty by 2.35 percent of the total poor households in the urban area

Table 2. The Simulation Results of the Reduction in Fuel Subsidy by 12.35 Percent and Diverted it to Other Crops on the Level of Poverty

| FGT Index | Baseline | | | Sim_a | | | Changes (Δ) | | |
|-----------|--------------|--------------|--------------|--------------|--------------|--------------|----------------------|--------------|--------------|
| | $\alpha = 0$ | $\alpha = 1$ | $\alpha = 2$ | $\alpha = 0$ | $\alpha = 1$ | $\alpha = 2$ | $\alpha = 0$ | $\alpha = 1$ | $\alpha = 2$ |
| HH-1 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| HH-2 | 1.0000 | 0.1916 | 0.0577 | 0.9839 | 0.1890 | 0.0568 | -0.0161 | -1.3477% | -1.4855% |
| HH-3 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| HH-4 | 1.0000 | 0.1926 | 0.0620 | 0.9782 | 0.1890 | 0.0608 | -0.0218 | -1.8969% | -1.9095% |

Source: Research Result

Table 3. The Simulation Results of the Reduction in Fuel Subsidy by 43.2 Percent and Diverted it to the Other Crops on the Level of Poverty

| FGT Index | Baseline | | | Sim_a | | | Changes (Δ) | | |
|-----------|--------------|--------------|--------------|--------------|--------------|--------------|----------------------|--------------|--------------|
| | $\alpha = 0$ | $\alpha = 1$ | $\alpha = 2$ | $\alpha = 0$ | $\alpha = 1$ | $\alpha = 2$ | $\alpha = 0$ | $\alpha = 1$ | $\alpha = 2$ |
| HH-1 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| HH-2 | 1.0000 | 0.1916 | 0.0577 | 0.9765 | 0.1874 | 0.0563 | -0.0235 | -2.1736% | -2.3977% |
| HH-3 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| HH-4 | 1.0000 | 0.1926 | 0.0620 | 0.9355 | 0.1820 | 0.0586 | -0.0645 | -5.5292% | -5.5882% |

Source: Research Result

**Table 4. The Simulation Results of the Reduction
in Fuel Subsidy by 100 Percent and Diverted it to the Food Crops on the Level of Poverty**

| FGT Index | Baseline | | | Sim_a | | | Changes (Δ) | | |
|-----------|--------------|--------------|--------------|--------------|--------------|--------------|----------------------|--------------|--------------|
| | $\alpha = 0$ | $\alpha = 1$ | $\alpha = 2$ | $\alpha = 0$ | $\alpha = 1$ | $\alpha = 2$ | $\alpha = 0$ | $\alpha = 1$ | $\alpha = 2$ |
| HH-1 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| HH-2 | 1.0000 | 0.1916 | 0.0577 | 0.6443 | 0.1191 | 0.0336 | -0.3557 | -37.8543% | -41.7008% |
| HH-3 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| HH-4 | 1.0000 | 0.1926 | 0.0620 | 0.5160 | 0.1007 | 0.0308 | -0.4840 | -47.7333% | -50.3329% |

Source: Research Result

coupled with the 6.45 percent of the total poor households in the rural area. While diverting all subsidies to Non-Food Crops sector can reduce poverty rate of poor households in urban area by 35.57 percent and 48.40 percent in rural area.

The impact of subsidy diversion on rural poverty reduction is indeed much larger than in urban area. The rural community has greater access to Non-Food Crops sector than the urban poor; hence the income increase of poor households in rural area is also greater than the poor households in urban area. In addition, the rural economic structure is much simpler than in urban, therefore the opportunity to get a job relatively much easier. This is in line with Wilson (1996) and Brady, et. al (2010), who argued the concentration of poverty in the city is a result from the jobs that disappear.

The analysis shows that if the goal is to reduce poverty, then diverting subsidy to the Non-Food Crops sector is one policy alternative (*ceteris paribus*). This is in line with the study by Abimanyu (2000) who found that the agricultural sector provides greater benefits, especially in the rubber plantation business. Furthermore, subsidy is the most effective way to alleviate the rural poverty, as Ravallion and Datt (1999) argued that the growth in the agricultural sector is the most efficient way in reducing income inequality and the poverty. Arndt, et. al (1998) also support this argument with his empirical findings that the development of the agricultural sector can reduce poverty.

Institute of Bogor Agricultural carried out empirical research in 2002, and found that the Agriculture Based Development (ABD) model may spur higher economic growth. The growth of manufacture is important for overall economic growth, but the growth of the agricultural sector is very important to increase the employment and to reduce the poverty.

Bigsten and Levin (2000) stated that some strategic elements to reduce poverty are outward-oriented strategy, in the form of export-led economic growth. This strategy is based on the labor intensive manufacturing, the agriculture and the rural development. Bautista (2001), Jansen and Tarp (2004), and Susilowati (2008), argued that the concept of Agricultural Demand Led Industrialization, beside improving macroeconomic performance, will also play a role in reducing income inequality and poverty in rural households. This conclusion is supported by

Suselo and Tarsidin(2008), who concluded that the most appropriate strategy to reduce poverty is to give more attentionon agriculture, plantations and fisheries.

V. CONCLUSIONS

This paper provide two conclusions, *first*, the fuel subsidy diversion to Non-Food Crops sector provides a positive impact on increasing household incomes and poverty reduction. This requires further investigation on which sub-sectors of Non-Food Cropss hould be the target with dominant impact on poverty reduction, and also the mechanism of the subsidy transfer. *Second*, the fuel subsidy diversion to Non-Food Crops sector provides better positive impact for rural household than the urban households.

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